EO3502
TELECOMMUNICATIONS SYSTEMS ENGINEERING (3-0)
Winter 2003

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Prerequisites: MO1901 (A brief survey of selected calculus and post-calculus topics - single variable derivatives and integrals, infinite series and sequences, complex numbers, and Fourier series and transforms.)

Objective: To provide an overview of the fundamental concepts and technologies involved in modern telecommunication systems.

Text: No text; online lecture notes available on Blackboard (nps.blackboard.com). All preregistered students should be able to access Blackboard

Grading: 2 Midterms @25% 50%
Final 50

Other notes: 1. Exams are closed book and notes, but students may bring 8 ½" by 11" sheet of notes: 1 for 1st midterm, 2 for 2nd midterm, 3 for final
2. Laboratory Demonstrations: a) Antenna measurements, b) Optical networks, c) Millimeter wave link

Syllabus:

Lesson	Topics
01	Introduction to systems and signals
02	Telephone system
03	Cellular systems
04	Wireless systems and wave propagation
05	Antennas
06	Fiber optical systems
07	Optical fiber technology
08	Sampling of analog signals
09	Digital modulation and line codes
10	Multiple access techniques
11	Links: carrier-to-noise and energy-to-noise density ratios
12	Satellite communication systems
13	Noise and interference sources and their effects
14	Review of Fourier series
15	Review of Fourier transforms
16	Signal behavior on finite transmission lines
17	Amplitude modulation
18	Demodulation, superheterodyning and sidebands
19	Angle modulation: frequency and phase modulation
20	Aspects of frequency modulation
21	Pulse modulation

References

Wireless and networking:

Broadband Telecommunications Handbook, R. Bates, McGraw-Hill.
Guide to Wireless Communications, M. Ciampa, Thomson.
The Essential Guide to Telecommunications, A. Dodd.
Fundamentals of Telecommunications, R. Freeman, Wiley-Interscience.

EM, antennas, propagation and transmission lines:

Fundamentals of Applied Electromagnetics, F. Ulaby, Prentice-Hall.
Electromagnetics for Engineers, S. Schwarz, Oxford.
Practical Antenna Handbook, J. Carr, Tab Electronics.
Antennas with Wireless Applications, L. Setian, Feher/Prentice Hall.

Communication systems and signal processing:

Communication Systems, S. Haykin, Wiley.
Electronic Communications Systems, W. Tomasi, Prentice Hall.
Modern Communication Systems, Principles and Applications, R. Couch II, Prentice Hall.
Digital Signal Processing Technology, D. Smith, AARL.
Signals, Systems and Transforms, L. Phillips and J. Parr, Prentice-Hall.
Digital Signal Transmission, C. Bessel and D. Chapman, Cambridge.
Communications Systems and Networks, R. Horak, M&T Books.
Understanding Telephone Electronics, S. Bigilow, Newnes.
Satellite Communications Systems, M. Richharia, McGraw Hill.